(No Model.)

J. J. BANTA.

RATCHET DRILL.

No. 326,381. Patented Sept. 15, 1885.

Fig. 1.

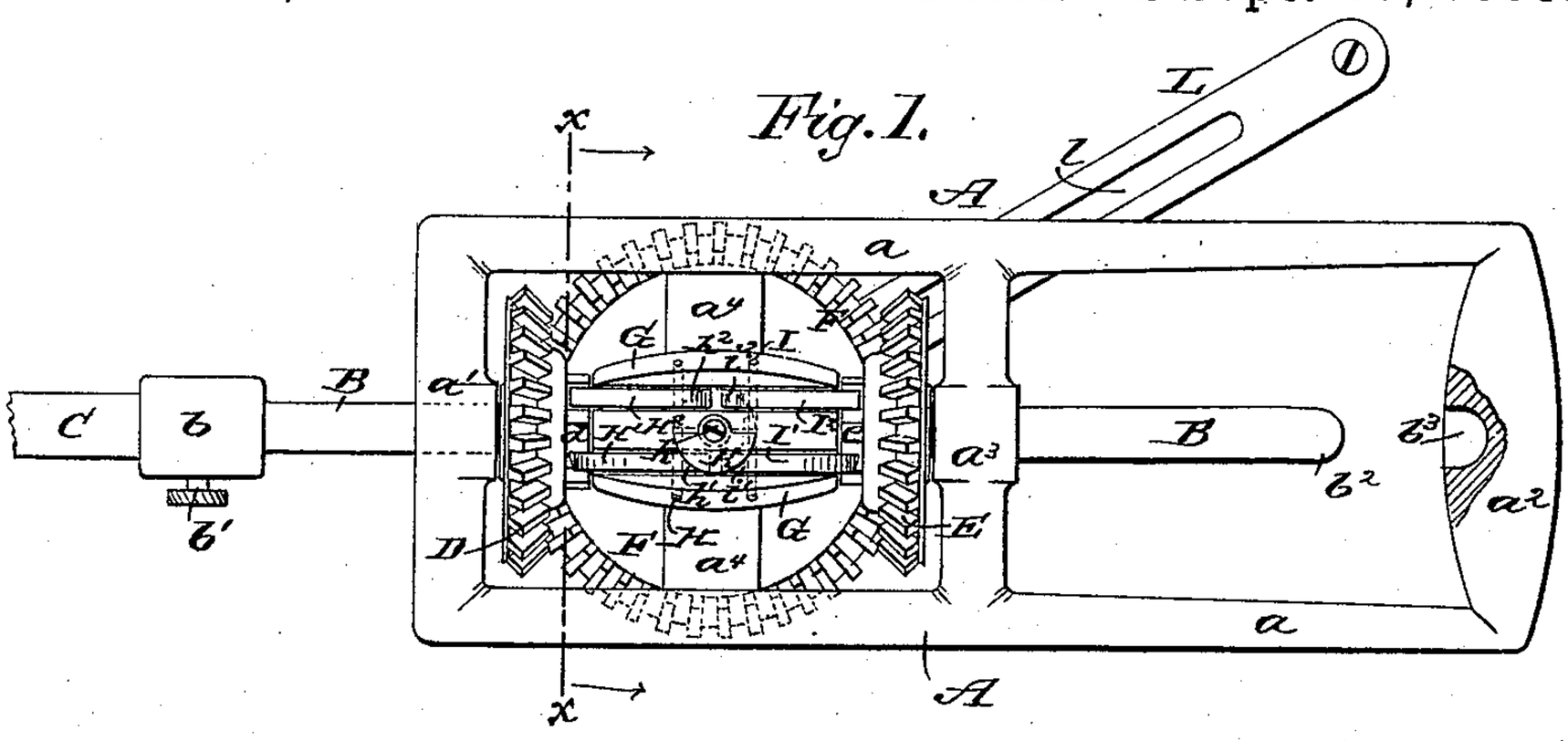


Fig. 2.

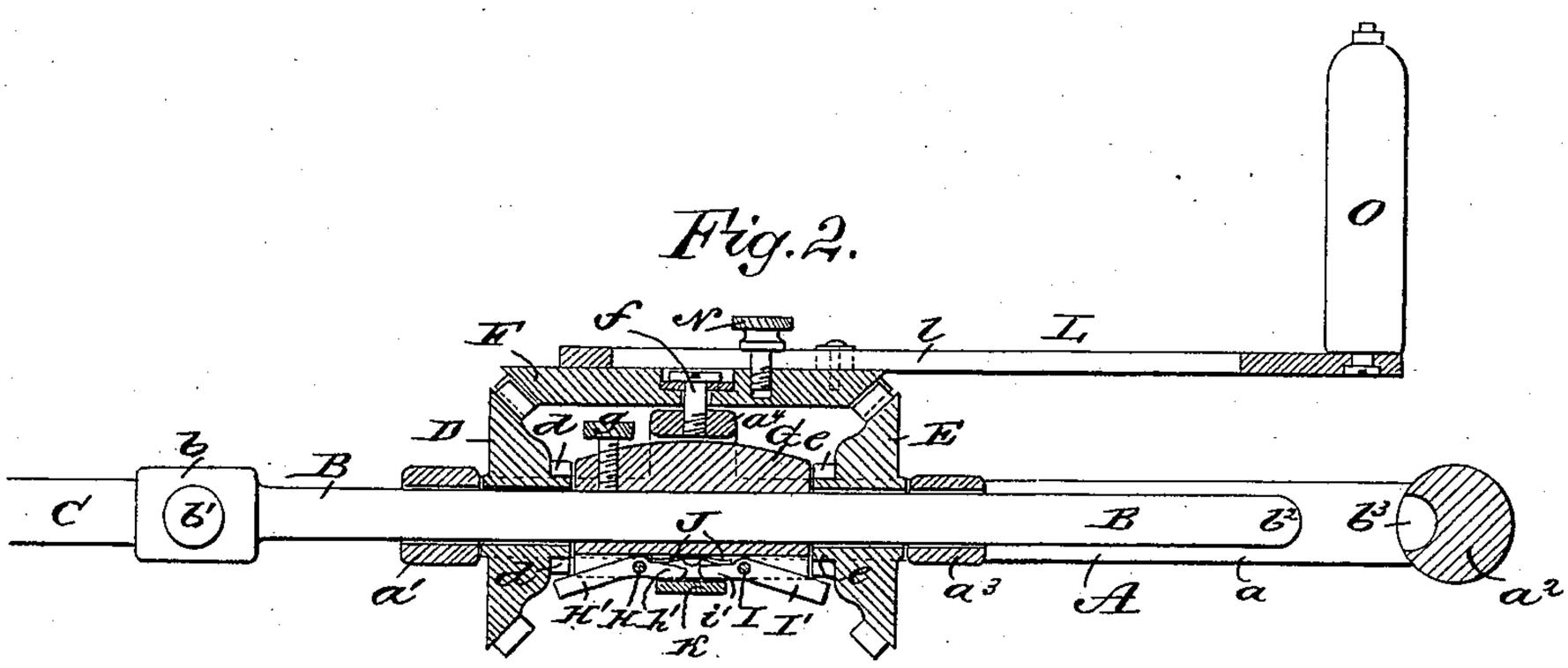


Fig. 3.

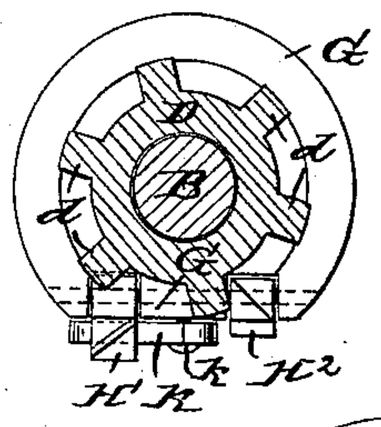


Fig. 4.

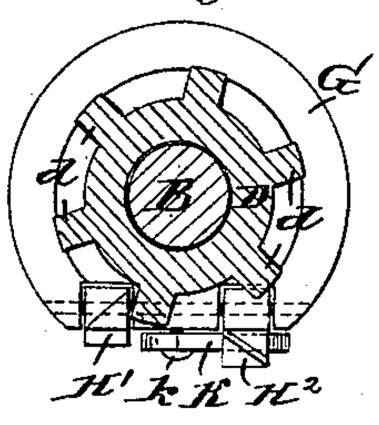


Fig. 5.

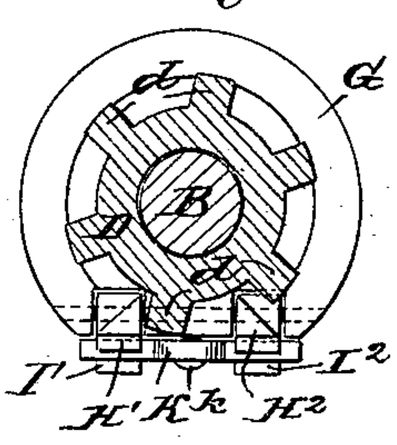
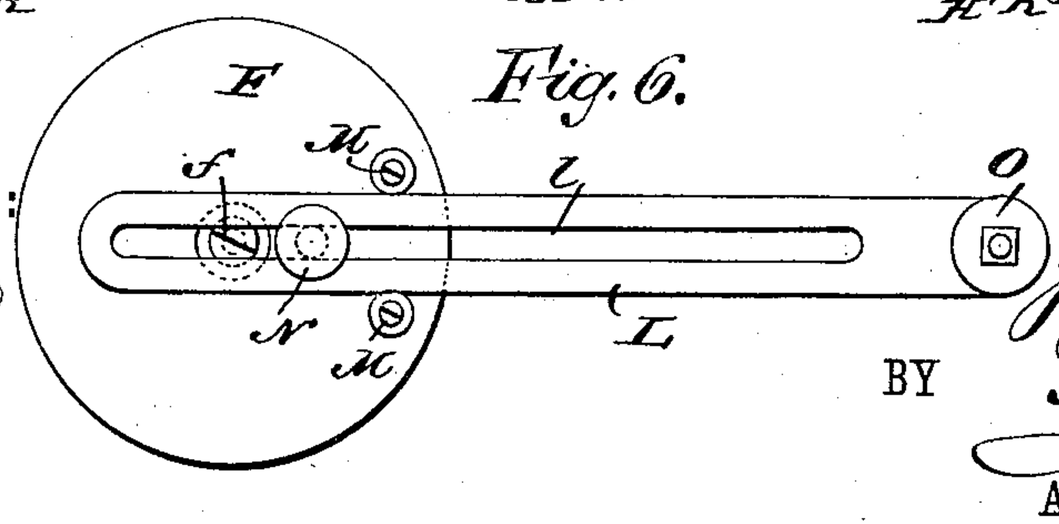


Fig. 6.



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RATCHET-DRILL.

SPECIFICATION forming part of Letters Patent No. 326,381, dated September 15, 1885.

Application filed June 19, 1885. (No model.)

To all whom it may concern:

Be it known that I, JOHN JACOB BANTA, of Pacific, in the county of Franklin and State of Missouri, have invented a new and Improved Boring-Machine, of which the following is a full, clear, and exact description.

The object of my invention is to improve the construction of ratchet boring or drilling machines, so as to insure their easier adjustment and more efficient operation.

The invention comprises a novel arrangement of pawls in a block fixed to the tool-holding spindle, which is journaled in a frame or stock, said pawls being adapted to engage and slip over ratchet-teeth fixed to bevel-pinions loose on the spindle and driven by a gear-wheel and crank. The pawl-block is fitted with a button which may be turned to hold any two opposite pawls away from their respective ratchets, all as hereinafter fully described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of my improved boring-machine, partly in section. Fig. 2 is a longitudinal sectional elevation of the same in edge view. Figs. 3, 4, and 5 are enlarged cross-sectional elevations of the ratchet-and-pawl mechanism, taken on the line *x x*, Fig. 1, and showing different operative positions of parts, and Fig. 6 is a side elevation of the adjustable crank.

The letter A indicates the frame or stock of the machine, which has opposite side bars, *a a*, a forward end bar, a', a back end bar, a^2, and an intermediate cross-bar, a^3.

In bearings in the bars a' a^3 of frame A is journaled a spindle, B, which has a socket-head, *b*, in which a boring-tool, C, may be held and secured by a set-screw, b', or otherwise.

On the spindle B are placed loosely the opposite bevel-pinions or gear-wheels, D E, the teeth of which mesh with the teeth of the driving gear-wheel F, which is journaled on a suitable screw pin or stud, *f*, fixed in a cross-bar, a^4, which is secured to the opposite side bars, *a a*, of frame A, and ranges across the face of the frame.

Between the opposite bevel-pinions, D E, is placed on the spindle B the block G, and a set-screw, *g*, threaded into the side of the block serves to bind the block to the spindle, and also allows the spindle to be adjusted lengthwise in the frame, so as to project its socket-head *b* forward more or less, or to allow the back end or heel, b^2, of the spindle to be set into the thrust cavity or socket b^3 in the back cross-bar or handle, a^2, of the frame when a lever purchase or pressure is to be used on the bar a^2 in heavy boring or reaming.

In grooves formed in the flattened side portion of the block G are pivoted, on the pins H I, the two pairs of pawls H′ H^2 and I′ I^2, so that the projecting ends of these pawls are adapted to engage the ratchet-teeth *d e*, formed, respectively, on the inner surfaces or parts of the bevel-pinions D E. Springs J, fixed to block G, act on the inner ends, h' h^2 i' i^2, of the pawls to throw their outer ends normally into engagement with the pinion-ratchets.

The ends of the pairs of pawls at opposite ends of the block G are cut diagonally or outward and backward from their inner corners, so as to provide square faces next the inner walls of the grooves in which the pawls are pivoted, to act on the ratchets *d e* of pinions D E when the pawls are turned with the block G in one direction, and so as to provide beveled faces which will slip over the ratchet-teeth when turning the other way.

The operation of the pawls in the ratchets is controlled by means of a button, K, which is pivoted at *k* to the center of the flattened portion or face of the block G, and has a semi-circular form, so that it may be turned over the inner ends of any two opposite pawls to lift their outer ends away from the ratchets and cause them to be inoperative, as hereinafter more fully explained.

For revolving the drive-wheel F, I use a crank-bar, L, which is slotted lengthwise, as at *l*, and is held between studs M M, fixed to the drive-wheel by means of a clamp-screw, N, which passes through the slot *l* into the drive-wheel.

A handle, O, is attached at the outer end of the bar L. By loosening the screw N the bar L may be slid along between the studs M

M to bring its handle O nearer to or farther from the journal *f* of the drive-wheel F to decrease or increase the leverage of the crank, as circumstances shall require.

The operation of the pawl-and-ratchet mechanism in driving the tool-holding spindle B is as follows:

When the button K is set over the ends *h' i'* of pawls H' I' to hold these pawls out of engagement with the ratchets *d e* of bevel-pinions D E, as indicated in Figs. 1, 2, and 3, and as the crank is oscillated or worked from a vertical to a horizontal position and back, the pawls H^2 I^2 will alternately engage and slip over the ratchets *d e*, and the spindle B will be rotated continuously in one direction or toward the right hand.

When the button K is set over the ends h^2 i^2 of the pawl H^2 I^2, to hold these pawls from the ratchets *d e* in Fig. 4, the pawls H' I' will alternately engage and slip over the ratchets, and the spindle B will be continuously rotated toward the left hand by the oscillation of the lever.

When the button K is set over the ends *i' i²* of the pawls I' I^2 to hold said pawls from the ratchet *e*, as in Fig. 5, the pawls H' H^2 will be operative in ratchet *d* for turning the spindle B continuously to the right or left by a continuous rotation of the drive-wheel by the crank in opposite directions, this adjustment of the pawls being intended especially for driving the spindle B toward the right hand as the crank moves forward from its upper vertical position by the engagement of pawl H^2 with the ratchet *d* of bevel-pinion D, the bevel-pinion E then turning freely in the reverse direction on the spindle B.

When the button K is set over the ends *h' h²* of pawls H' H^2 to hold said pawls from the ratchet *d*, the pawls I' I^2 will be operative in ratchet *e* for turning the spindle B continuously to the left or right by corresponding continuous rotations of the drive-wheel and crank, this adjustment of the pawls being intended especially for driving the spindle toward the left hand as the crank is turned over forward from its upper vertical position by the engagement of the pawl I' with the ratchet *e* of bevel pinion E, the pinion D then turning freely in the reverse direction on the spindle B.

It is obvious that with the construction above described the spindle B with the drill, reamer, tap, or other tool held therein, may be turned either to the right or left either by the continuous rotation or the oscillation of the lever; hence the machine is adapted to a wide range of work, and the work may be accomplished in difficult or quite inaccessible places with economy of time and labor, and the machine may be made cheaply, and is not likely to get out of order.

When the machine is used for light work, the back end bar, a^2, will be held by one hand and the crank L will be turned by the other hand; or the back end of the frame may be formed as a plate to rest against the breast or body of the operator, as will readily be understood.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A boring-machine comprising a frame, A, a tool-holding spindle, B, journaled therein, bevel-pinions D E, loose on the spindle, and provided, respectively, with the ratchets *d e*, a block, G, fixed to the spindle to revolve therewith, spring-pressed pawls H' H^2 I' I^2 fitted in the block, and adapted to engage and slip over the ratchet-teeth, a semicircular button, K, pivoted to the block and adapted to hold the pawls away from the ratchets, and a drive gear-wheel, F, meshing with the pinions D E, substantially as herein set forth.

2. A boring-machine comprising a frame, A, made with side bars, *a a*, cross-bars *a' a³ a⁴*, and said bar a^2 having a thrust-cavity, b^2, the spindle B, journaled in cross-bars *a' a³*, bevel gear-wheels D E, loose on the spindle, and provided, respectively, with the ratchets *d e*, a block, G, fixed to the spindle by a set-screw or equivalent device, allowing longitudinal adjustment of the spindle, spring-pressed pawls H' H^2 I' I^2, fitted to block G, and adapted to the ratchets, and a drive gear-wheel, F, substantially as herein set forth.

3. In a boring-machine, the combination, with the frame A, tool-holding spindle B, and ratchet-pinions D *d* E *e*, of the block G, fitted with spring-pressed pawls H' H^2 I' I^2, adapted to engage and slip over the ratchet-teeth, and means, substantially as described, for holding the pawls H' I' H^2 I^2 alternately away from the ratchets *d e*, substantially as herein set forth.

4. In a boring-machine, the combination, with the frame A, tool-holding spindle B, and ratchet-pinions D *d* E *e*, of the block G, provided with spring-pressed pawls H' H^2 I' I^2, adapted to engage and slip over the ratchet-teeth, and the button K, substantially as herein set forth.

5. The combination, with the frame A, the drive-wheel F, provided with studs M M, and the spindle-operating gearing, substantially as described, of the crank-handle L, slotted at *l*, and the set-screw N, substantially as herein set forth.

6. The combination, with a spindle, as B, journaled in a suitable frame, of two pinions, as D E, provided with ratchet-teeth, and loosely mounted on the spindle, a block, as G, secured on the spindle between the pinions, spring-pressed pawls on the block engaging the ratchets on the pinions, a button on the block for throwing the pawls out of engagement, and an operating-wheel engaging the pinions, substantially as shown and described for operation, as set forth.

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